HOT TECHNOLOGY FOR AUSTRALIAN TIMBER

Australian scientists have developed a microwave technology that has potential to revolutionise the world timber industry, slashing the time it takes to convert a green log to dried finished boards from months to days.

The new treatment technology under development by Cooperative Research Centre for Wood Innovations is poised to enter commercial production following intended major investment by Australian Solar Timbers, in Kempsey, NSW.

“Currently sawn hardwood timber requires a long, slow drying process. However, after microwave treatment, green sawn boards can be dried in one tenth of the usual time,” said Professor Peter Vinden, Chief Executive of the CRC for Wood Innovations.

“This will give the Australian sawn timber industry a vital productivity edge over its rivals, and lead to better quality and higher-value uses for our precious hardwoods.

“It is also a green technology: because it yields better quality wood it will increase utilization of plantation timbers, so helping the growth of that sector.”

A market assessment by timber technology firm MTech estimates a medium sized sawmill can boost its annual drying throughput by almost 40 per cent, to 9000 cu m3, just by using the microwave processing technology.

Hardwood sawmillers dry sawn boards under controlled temperature conditions for several months, depending on the type of tree they come from. There are two stages – pre-drying and final drying. Using the Australian microwave treatment, a conventional drying process of 2 to 4 months can be shortened to 6 to 10 days, Prof. Vinden says.

The reduced processing time offered by the microwave technology greatly increases throughput capacity, allows sawmillers to respond more rapidly to market demands, and reduces holding and handling costs costs due to shorter processing times for timber stocks.

The process offers enormous economic benefits to the Australian timber industry, says Dr Douglas Head, whose company Australian Solar Timbers (AST) has committed to investing in the first commercial microwave plant at his established
hardwood sawmill in Kempsey, which exclusively produces solid hardwood flooring products. AST is currently seeking government support for installation of the first fully commercial plant in Australia, said Dr Head. The potential increase in yield and product quality offered by the microwave technology is particularly attractive, he said.

The capital costs of a microwave plant are estimated to be no more than the capital cost of the large capacity kiln that would be required for conventional processing.

Prof. Vinden says microwave processing can also increase the timber yield from each log processed, by reducing defects that occur during the drying process.

“The quality of backsawn timber from ash-type eucalypts dried conventionally is frequently reduced by the formation of small cracks throughout the timber which affect the appearance, final quality and price of the product.”

“Microwave processing helps reduce crack formation and end-splitting, and so generates more timber suited to high value uses such as furniture.”

“When widely adopted, this technology can improve the value of the whole Australian hardwood sawn timber harvest, making better use of our native resources and plantation timbers.”

Microwave treatment causes microscopic changes in wood structure. Inside the wood, microwave energy is converted to heat, creating steam pressure in the wood cells. This causes some thin-walled wood cells to break open, creating microscopic voids in the wood which allow the moisture to escape more easily, and the wood to dry more quickly.

Microwave treatment can increase wood permeability several thousand times. Research at CRC Wood Innovations shows that, by adjusting the amount of microwave energy, the formation of microvoids – and hence permeability – can be controlled.

As well as the microwave drying work, CRC Wood Innovations researchers are exploring the use of microwaves for rapid and complete preservation of timber, and to rapidly bend wood for furniture components. These all address National Research Priorities to create frontier technologies which transform industry and lead to a sustainable Australia, Prof. Vinden says.

More information:

Nola Wilkinson, CRC Wood Innovations, 03 8344 5237
Email: n.wilkinson@unimelb.edu.au
Dr Douglas Head, CEO Australian Solar Timbers, 0408 856 022
GRAPHIC AND PICTURES AVAILABLE:

Prof. Julian Cribb, CRCA Media, 0418 639 245
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